Water Supply Outlook For Washington

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

Cooperating with

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

AS OF
JUNE 1, 1979

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO: VIEW OF A SNOTEL DATA SITE IN THE SNOWY RANGE IN WYOMING. TALL CYLINDRICAL DEVICE IS A PRECIPITATION GAGE. SNOW PILLOWS ON THE GROUND NOT VISIBLE DUE TO SNOW COVER. SHELTER HOUSE, ANTENNA TOWER, ANTENNA, AND TEMPERATURE UNIT ARE VISIBLE BEHIND THE PRECIPITATION GAGE.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 510, 511 N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	Room 129, 2221 East Northern Lights Blvd., Anchorage, Alaska 99504
Arizona	Room 3008, Federal Building, 230 N. First Ave., Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno, Nevada 89505
Oregon	1220 S. W. Third Ave., Portland, Oregon 97204
Utah	4420 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U. S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Snow Surveys Branch, California Department of Water Resources, P.O. Box 388, Sacramento, California 95802 --- for British Columbia by the Ministry of the Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia V8V 1X5 --- for Yukon Territory by the Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory Y1A 3V1 --- and for Alberta, Saskatchewan, and N.W.T. by the Water Survey of Canada, Inland Waters Branch, 110-12 Avenue S.W, Calgary, Alberta T3C 1A6.

WATER SUPPLY OUTLOOK FOR WASHINGTON

and

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

Issued by

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USDA SCS PORTLAND OR 1976 M7-L-220788

WATER SUPPLY OUTLOOK

State of Washington

June 1, 1979

****
* The water supply picture continues to deteriorate as the *
* spring progresses. We measure very few snow courses in the *
* state of Washington as of June 1, and only a few were *
* measured as of May 15. Most of the snow course readings are *
* made in the tributary basins in Montana and British *
* Columbia. Except for one snow course in Montana, all May 15 *
* readings are subnormal - ranging from 14 percent to *
* 132 percent. As of June 1, all snow courses have lost *
* ground and the snow cover now ranges from 11 percent to *
* 79 percent. Rainfall was subnormal over the whole state; *
* and only in the Upper Columbia Drainage Division, was *
* precipitation above normal. The above normal temperatures *
* of this past month accounted for the good streamflows that *
* occurred from the lower elevation watersheds such as the *
* Palouse, Walla Walla, and Spokane, The main stem of the *
* Columbia was just a fraction below normal. *
****

THIS IS THE LAST WATER SUPPLY OUTLOOK REPORT FOR 1979. IF YOU WISH TO RECEIVE THESE REPORTS NEXT YEAR, PLEASE RETURN THE BACK COVER OF THE MAY 1 REPORT IF YOU HAVE NOT ALREADY DONE SO.

SNOW COVER

In the Pend Oreille River Drainage, May 15 snow cover was 84 percent of normal. This deteriorated to 59 percent of normal as of June 1. Fewer snow courses were measured in the Kettle River Basin, and the snow cover went from 68 percent on May 15 to 13 percent on June 1. No measurements were made in the Colville Drainage; but on the Spokane Watershed, the snowpack decreased from 62 to 45 percent. The most snow courses were measured in the Okanogan Basin. There, the snowpack decreased only 11 percent - from 51 to 40 percent. Nothing was measured on the Methow and only May 15 measurements were made in the Chelan Lake Basin where the snow cover from four snow courses averages 60 percent of average. On the Wenatchee Drainage, only Stevens Pass and Stevens Pass Sand Shed were measured. The Stevens Pass Snow Course went from 31.2 inches of water to 13.5, a drop of 31 percent from 64 to 33 percent. The Sand Shed Course had 13.3 inches of water on the 14th, but by the 31st, was bare. Stampede Pass was the only snow course measured in the Yakima Drainage. This course dropped from 41 percent of normal on May 14 to 13 percent as of May 31.

RESERVOIRS

Irrigation reservoirs are all in excellent shape. Most have spilled already or will in the next week. Power reservoirs have generally above normal amounts of water in storage and these should all fill within the next month.

PRECIPITATION

Rainfall over the state and tributary basins during May was below normal in all drainage divisions except the Columbia above Castlegar. The range was 7 percent above to 58 percent below. The latter was for the Central Washington Drainage Division. The spring period of April and May was better. Above normal rainfall occurred in the Pend Oreille and Southeastern Washington Drainage Divisions - 4 and 18 percent above, respectively. Central Washington is still the low rainfall area with 40 percent below average precipitation.

STREAMFLOW

Warm, dry weather prevailed over most of the state during May. The warm air melted the snow at an above normal rate, but generally not at a rate that caused much damage. Above normal flows occurred on the Skykomish, Pend Oreille, Spokane, Wenatchee, Palouse, and Walla Walla Rivers, with subnormal flows for the rest. The Klickitat had the least flow, percentagewise, 67 percent; and the Palouse the greatest, 154 percent.

RESERVOIR STORAGE - 1000 Acre Feet

BASIN OR STREAM	RESERVOIR	USABLE 1/ CAPACITY	Measured June 1 1979	1978	1977	Normal*
		COLUMBIA				
Spokane	Coeur d"Alene Lake	225.1	236.2	190.0	239.6	225.0
Columbia	Franklin D. Roosevelt Lake	5232.0	3433.6	2211.4	2580.9	2565.6
Columbia	Banks Lake	714.9	456.6	527.9	616.0	406.2
Okanogan	Conconully Reservoir	13.0	10.5	9.6	6.5	9.1
Okanogan	Salmon Lake	10.5	8.1	10.5	9.4	9.4
Chelan	Lake Chelan	676.1	437.3	470.3	391.3	450.6
		YAKIMA				
Yakima	Keechelus Lake	157.8	157.6	158.9	140.6	139.6
Kachess	Kachess Lake	239.0	236.9	242.2	223.6	217.1
Cle Elum	Lake Cle Elum	436.9	338.0	441.2	391.8	367.9
Bumping	Bumping Lake	33.7	35.1	34.7	34.9	25.4
Tieton	Rimrock Lake	198.0	171.0	199.0	161.9	160.2
		PUGET SOUND				
Skagit	Ross Reservoir	1404.1	1107.7	1068.0	689.9	1033.9
Skagit	Diablo Reservoir	90.6	87.2	84.9	86.8	86.1
Skagit	Gorge Reservoir	9.8	8.1	8.2	7.9	8.3

1/ Based on Active Storage

* 15-yr. Average 1963-1977

PRECIPITATION 1/

Division Average Observations and Departures

Drainage Divisions	FALL Sept-Oct 1978 2/ Observed	FALL Departure	WINTER Nov.-1978--Mar.-1979 Observed	WINTER Departure	SPRING Apr-May 1979 2/ Observed	SPRING Departure
Columbia in Canada	6.29	+1.27	12.00	-3.51	3.41	-0.06
Pend Oreille - Spokane	2.09	-1.95	13.90	-4.36	4.00	+0.15
Northeastern Washington	1.74	-0.73	7.27	-2.13	2.58	-0.43
Southeastern Washington	1.22	-1.29	9.82	-0.61	3.46	+0.53
Central Washington	0.60	-0.37	3.34	-1.94	0.81	-0.54
North Central Washington	2.22	+0.63	3.78	-2.76	1.16	-0.61
Northwest Slope Cascades	9.89	-3.32	43.16	-12.23	9.40	-0.97
Southwest Slope Cascades	6.18	-2.50	26.74	-14.90	6.00	-1.34

Northeastern Washington - Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.

Southeastern Washington - Touchet, Tucannon and Palouse Drainages.

Central Washington - Yakima, Wenatchee and Chelan Drainages.

North Central Washington - Methow and Okanogan Drainages.

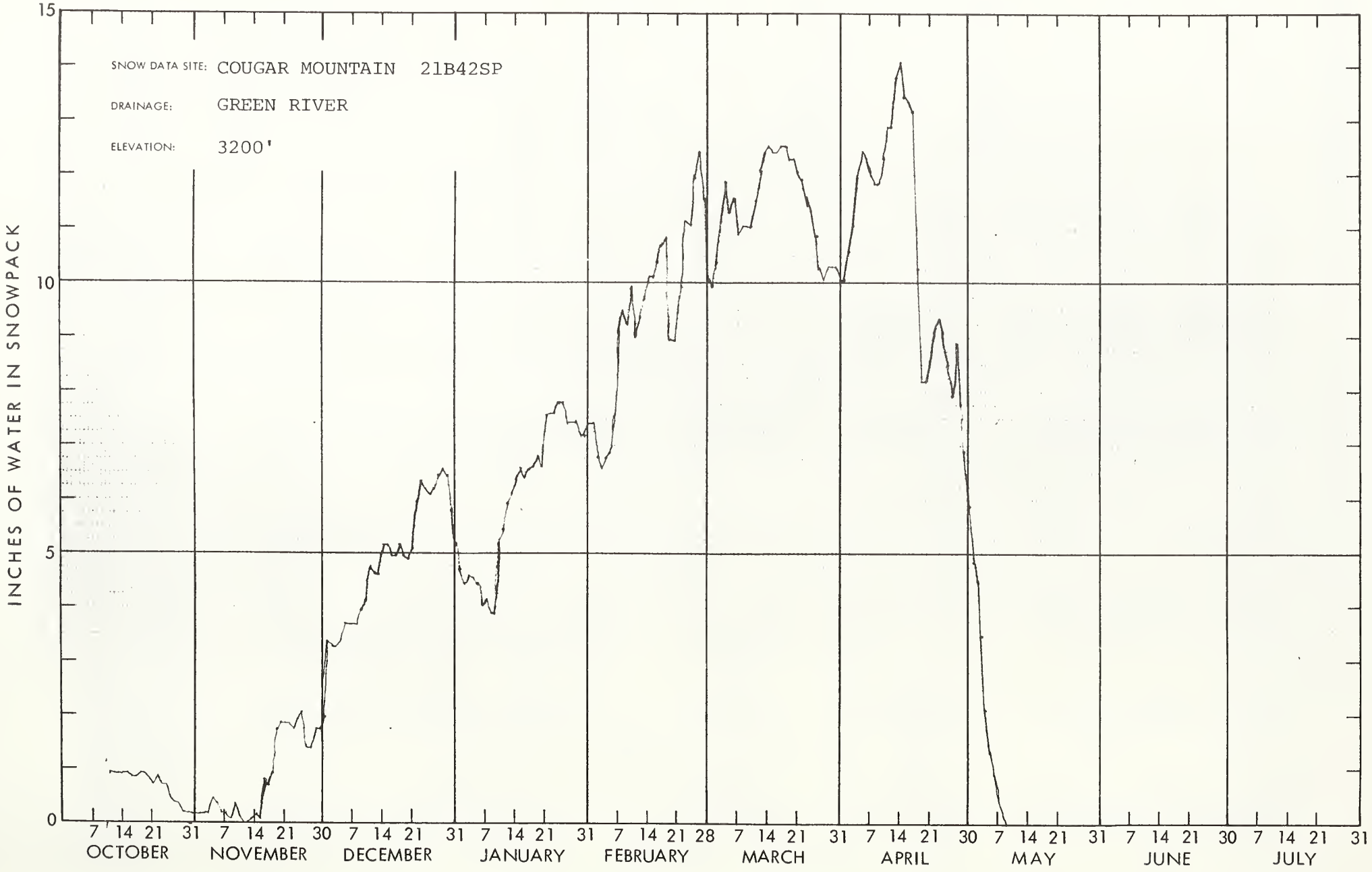
Northwest Slope Cascades - Puget Sound Drainages.

Southwest Slope Cascades - Lower Columbia Drainages.

1/ - Preliminary analysis by National Weather Service from data furnished by Meteorological Services of Canada and the National Weather Service.

2/ - Departure from 15-year (1958-72) drainage division average.

WSFB-X13A


SNOW DATA SITE: COUGAR MOUNTAIN 21B42SP
DRAINAGE: GREEN RIVER
ELEVATION: 3200'
INCHES OF WATER IN SNOWPACK
15
10
5
0
7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 31 7 14 21 28 7 14 21 31 7 14 21 30 7 14 21 31 7 14 21 30 7 14 21 31
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY

SNOW DATA TO JUNE 1, 1979 - APPENDIX 1

SNOW			THIS YEAR			PAST RECORD	
DRAINAGE BASIN and/or SNOW COURSE			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	Number	Elevation				Last Year	Average#
UPPER COLUMBIA DRAINAGE							
PEND OREILLE RIVER							
Baree Creek	15B11	5500	5/15	63	33.1	33.9	41.5
Baree Midway	15B16	4600	5/15	40	21.1	14.8	25.0
Baree Trail	15B15	3800	5/15	0	0.0	0.0	0.0
Heart Lake Trail	14C10	4800	5/15	27	13.5	2.8	10.2
			5/31	0	0.0	-	-
Hoodoo Basin	15C10	6000	5/15	87	40.0	43.7	50.5
			5/31	50	28.8	39.2	39.0
Hoodoo Creek	15C01	5900	5/15	86	40.0	39.2	46.2
			5/31	54	28.9	36.9	36.5
Lookout	15b02	5250	5/13	39	20.0	22.5	30.9
			5/30	7	3.7	14.8	15.0
Nelson	19-Can	3050	5/14	1.6	0.7	0.0	1.1*
			5/30	0	0.0	0.0	0.1*
Schweitzer Bowl	16A06	4500	5/25	0	0.0	-	-
Schweitzer Ridge	16A05	6100	5/25	32	16.7	-	-
KETTLE RIVER							
Big White Mtn.	154-Can	5500	5/16	31	12.5	19.3	18.5*
			5/31	3.5	1.4	14.9	11.1*
Monashee Pass	48A-Can	4500	5/15	15	6.2	7.2	9.1*
			5/31	0	0.0	1.8	2.2*
SPOKANE RIVER							
Granite Peak	15B13A	6000	5/30	46	20.6	24.8	31.5
Lookout	15B02	5250	5/14	39	20.0	22.5	30.9
			5/30	7	3.7	14.8	15.0
Lost Lake	15B14A	6000	5/30	64	28.2	35.8	46.4
OKANOGAN RIVER							
Blackwall Mountain	100-Can	6250	5/15	41	19.6	30.7	36.6*
			6/1	19	10.4	21.7	28.7*
Brenda Mine	193-Can	4800	5/15	0	0.0	0.0	2.5*
			5/30	0	0.0	0.0	0.0*
Brookmere	27-Can	3200	5/13	0	0.0	0.0	2.3*
Enderby	130-Can	6250	5/15	67	28.0	48.1	45.2*
			5/31	51	23.4	47.4	39.1*
Hamilton Hill	107-Can	4900	5/13	0	0.0	9.7	6.8*
Isintok Lake	152-Can	5510	5/15	0	0.0	6.6	5.3*
McCulloch	4-Can	4200	5/15	0	0.0	0.0	0.6*
Missezula Mountain	106-Can	5100	5/14	0	0.0	7.5	2.9*

\# Average based on 1963-1977
* Average for years of record

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SNOW DATA TO JUNE 1, 1979 - APPENDIX 2

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
						Water Content (inches)	
NAME	Number	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Last Year	Average #
OKANOGAN RIVER (Cont.)							
Mission Creek	5A-Can	6000	5/15	40	15.8	22.0	19.5*
			5/29	18	6.9	19.9	12.6*
Monashee Pass	48A-Can	4500	5/15	15	6.2	7.2	9.1*
			5/31	0	0.0	1.8	2.2*
Mount Kobau	156-Can	5950	5/14	5.5	2.0	13.9	11.2*
			5/31	0	0.0	9.5	4.8*
New Penticton Res.#2	183-Can	5225	5/15	3.1	0.9	6.7	6.6*
			5/31	0	0.0	1.1	1.5*
Silver Star Mountain	99-Can	6050	5/14	41	17.0	31.6	26.7*
			5/30	17	6.9	28.5	17.4*
Summerland Reservoir	3A-Can	4200	5/15	0	0.0	0.8	2.5*
Trout Creek	3-Can	4700	5/13	0	0.0	1.0	1.9*
Vaseux Creek	233-Can	4600	5/14	0	0.0	0.0	0.3*
White Rocks Mountain	70-Can	6000	5/30	4	1.8	16.4	15.6*
CHELAN LAKE BASIN							
Cloudy Pass +	20A22a	6500	5/16	68	36.7	-	54.0
Little Meadows +	20A24a	5275	5/16	46	24.8	-	-
Lyman Lake	20A23A	5900	5/16	60	32.8	-	62.9
Park Creek Ridge	20A12A	4600	5/15	27	14.2	-	-
WENATCHEE RIVER							
Stevens Pass	21B01	4070	5/14	59	31.2	38.0	48.8
			5/31	25	13.5	24.7	40.6
Stevens Pass Sand Shed	21B45	3700	5/14	26	13.3	16.0	25.4
			5/31	0	0.0	2.9	18.7
YAKIMA RIVER							
Stampede Pass SP	21B10	3860	5/14	36	17.0	9.4	41.7
			5/31	7.1	3.6	2.0	26.9

\+ Snow water equivalent estimated from aerial stadia observation
\# Average based on 1963-77 average
* Average for years of record

SNOW DATA TO JUNE 1, 1979 - APPENDIX 3

SNOW			THIS YEAR			PAST RECORD	
DRAINAGE BASIN and/or SNOW COURSE			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	Number	Elevation				Last Year	Average #
LOWER COLUMBIA DRAINAGE							
PUGET SOUND DRAINAGE							
GREEN RIVER							
Stampede Pass SP	21B10	3860	5/14	36	17.0	9.4	41.7
			5/31	7.1	3.6	2.0	26.9
SKYKOMISH RIVER							
Stevens Pass	21B01	4070	5/14	59	31.2	38.0	48.8
			5/31	25	13.5	24.7	40.6
Stevens Pass Sand Shed	21B45	3700	5/14	26	13.3	16.0	25.4
			5/31	0	0.0	2.9	18.7
BAKER RIVER							
Dock Butte	21A11A	3800	5/24	60	33.0	-	57.2
Easy Pass	21A07A	5200	5/24	66	36.0	-	75.8
Jasper Pass	21A06A	5400	5/24	90	50.0	-	85.6
Marten Lake	21A09A	3600	5/24	93	51.0	-	68.9
Mount Blum	21A18a	5800	5/24	84	46.0	-	72.1
Panorama New	21A26	4300	5/14	75	45.9	-	-
Rocky Creek	21A12A	2100	5/24	0	0.0	-	2.2
Schreibers Meadow	21A10A	3400	5/24	40	22.0	-	46.3
S. F. Thunder Creek	21A14A	2200	5/24	0	0.0	0.0	-
Watson Lakes	21A08A	4500	5/24	67	37.0	-	62.6
NOOKSACK RIVER							
Panorama New	21A26	4300	5/14	75	45.9	-	-
CORRECTIONS AND ADDITIONS - 1979 SNOW REPORTS							
March 1							
YAKIMA RIVER							
Big Boulder Creek	21B09	3200	2/27	64	19.5	15.3	19.3
Waptus Lake +	21B49a	3024	2/19	93	31.6	30.8	41.4
Lake Cle Elum	21B14M	2200	3/1	32	10.8	7.0	9.2
April 1							
CHELAN LAKE BASIN							
Cloudy Pass +	20A22a	6500	4/7	86	38.7	-	49.8
Little Meadows +	20A24a	5275	4/7	88	39.6	-	49.0
Lyman Lake	20A23A	5900	4/7	99	43.8	59.3	65.5
Park Creek Ridge	20A12A	4600	4/7	68	66.7	46.6	47.0

\+ Snow water equivalent estimated from aerial stadia observation

\# Average based on 1963-77 average

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Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Ministry of the Environment, Water
Investigations Branch, Victoria, British Columbia

States:

Washington State Department of Ecology
Washington State Department of Natural Resources

Federal:

Department of the Army
  Corps of Engineers
U. S. Department of Agriculture
  Forest Service
U. S. Department of Commerce
  NOAA, National Weather Service
U. S. Department of the Interior
  Bonneville Power Administration
  Bureau of Reclamation
  Geological Survey
  National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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SPOKANE, WASHINGTON 99201

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